

**REMARKS**

The application has been amended and is believed to be in condition for allowance.

Claims 1-15, 17 and 19 are pending.

Claim 11 has been amended, but only as to form.

Claims 2-4 have been amended and claims 20-22 added. Support can be found from Figure 11 and specification, page 15, first full paragraph.

There are no formal matters outstanding.

Claims 1, 5, 11, and 15 are independent.

Claims 1-10 stand rejected as obvious over WOOLVERTON 5,519,596 in view of GO et al. 6,008,528 and KUSUDA et al. 5,245,198.

Applicants note that the Official Action has not specified which elements of the references are relied upon for making this rejection. This of course creates uncertainty as to the basis of rejection and impedes Applicants from making a fully informed response, Applicants being forced to guess which elements are being relied upon. In this instance, Applicants are uncertain how the three references would be combined and what the resulting structure would be.

In view of this shortcoming in the Official Action, should this application not be allowed at the next Official

Action, Applicants respectfully request issuance of a new, non-final Official Action with a more detailed rejection that clearly identifies (by element numbers) which aspects/elements of the prior art form the basis for the rejection.

The present invention is clearly distinguishable from the cited references for the following reasons.

In a lead frame of the type including an element loading portion supported by an outside frame via a tie bar, the present invention is characterized in that the tie bar includes a deformable portion which is easy to deform. The deformable portion deforms to absorb stress to act during lead forming, thereby preventing the other portions of the lead frame from deforming.

By contrast, WOOLVERTON simply discloses a module in which part of an LED mounting portion is made easily deformable for thereby implementing tridimensional mounting. WOOLVERTON therefore does not even suggest a mechanism for supporting an element loading portion by use of an outside frame and a tie bar.

GO teaches a structure for making a tie bar, which supports an element mounting portion, more firm. Consequently, nobody would be motivated to combine the teachings of WOOLVERTON and GO, i.e., the rejection appears to be hindsight.

YUSUDA has nothing to do with the present invention because YUSUDA simply proposes a lead frame configured to mount a plurality of photocoupling devices.

As relevant to the rejected claims, WOOLVERTON is offered as disclosing a metal nesting frame with a flexible joint between each row of LED bus bars 11. The Abstract discloses that the flexible joint allows the module to be assembled flat and then flexed in final installation of the assembled diode array product. In this regard, note that this flexibility concerns mounting of the assembled diode array product rather than assembly of the diodes to the frame. See the Abstract.

The Official Action correctly acknowledges that WOOLVERTON fails to disclose the recited tie bar structure and the recited physical characteristics of the tie bar structure.

Indeed, WOOLVERTON also fails to disclose the recited "outside frame formed with positioning holes." See that Claim 1 recites:

a tie bar to which an element loading portion to be loaded with a semiconductor element is connected by a lead forming portion;

an outside frame formed with positioning holes, said tie bar being connected to said outside frame; and

a deformable portion included in said tie bar for preventing said outside frame from deforming under extraneous physical stress.

WOOLVERTON does not include any element that Applicants would identify as an outside frame. Nor do Applicants see any positioning holes.

In any event, for the missing tie bar, GO et al. was offered. More particularly, GO et al. was offered as disclosing a lead frame with a channel beam tie bar, the channel beam tie bar said to have the recited tie bar structure.

With reference to Figure 3, GO et al. teach a lead frame 30 with four tie bars 32-35 supporting a die mount pad 31. The teaching of this reference is to make the tie bars as channels (Abstract, figures 4-6) in order provide a less flexible structure, i.e., to make the tie bars more rigid.

See column 1, lines 50-53 teach a need to prevent the flexing of the tie bars, and that the tie bars need to be strengthen. As per column 2, lines 50-55, the channel structure of the tie bar prevents the tie bar from flexing or bending. Therefore, the teaching of GO et al. is directly contradictory to the recitations of claim 1 which require the tie bar comprise a deformable portion.

In view of this, GO et al. teaches away from the present invention.

The Official Action also offers KUSUDA et al. for an optoelectronic device metal mold for manufacturing the device and manufacturing method of the device using the metal mold where the required physical characteristics of the tie bar structure are said to be disclosed.

Again, Applicants are uncertain exactly what recitations of the claims are being read onto this reference. However, at best, KUSUDA et al. Figures 11, 15-16 disclose tie bar 9 with leads 5-8 which result in a structure similar to that of the present application prior art Figures 1D-1E.

Thus, it would seem that KUSUDA et al. would teach "a tie bar to which an element loading portion to be loaded with a semiconductor element is connected by a lead forming portion."

Applicants see no motivation, save hindsight, for combining these references. As mentioned above, if GO et al. is combined with, e.g., KUSUDA et al., the result is to provide tie bars comprised of channels to prevent flexing of the tie bars. This is a direct teaching away of the present claim's recitations.

The Official Action offers as motivation to combine "in order to have a semiconductor device with better reliability." This justification is too vague as is not based on any teaching taken from the secondary references. As such, this is no motivation to combine.

Even if the references are combined, they do not result in the recited claim 1 invention, e.g., the channel structure of the tie bars teach away from the tie bar having a deformable portion.

Further, the claim recites the deformable portion being part of the tie bar, which tie bar is connected to an outside frame, and the deformable portion protects the outside frame from deforming under extraneous physical stress. The flexible joint 15 of WOOLVERTON is not located between a tie bar and any outside frame. Indeed, there is no outside frame.

In view of these shortcomings in the obviousness rejection, reconsideration and allowance of claim 1 are respectfully requested.

The dependent claims are believed patentable at least for depending from an allowable independent claim. Further, as per claim 2, where is the deformable portion configured to deform during lead forming? See that WOOLVERTON specifically teaches that the flexible joint is deformed after device assembly during mounting of the assembled device.

Also, where is the deformable portion being configured to absorb a force pulling the tie bar toward the element loading portion as per claim 3?

Independent claim 5 is similar to claim 1; however, note that the recitations are to a frame comprising a combination

of lead frames arranged to position the semiconductor elements one above the other.

The references are not seen as disclosing two lead frames which are arranged with respect to each other to position the semiconductor elements as recited. See that WOOLVERTON teaches a single nesting frame with plural diodes, the advantage being able to easily mount the diodes to the frame and then mounting the assembled product on a complex three dimensional space. To move from a single nesting frame to a combination of lead frames is contrary to the basic teaching of WOOLVERTON.

Again, the reference does not have an outside frame with positioning holes or a tie bar connected to an outside frame. Indeed, since a single frame is taught by WOOLVERTON, there is no need to have positioning holes as there are not plural lead frames needing to be positioned with respect to each other.

As with claim 1, there is no deformable portion in the tie bar for preventing the outside frame from being deformed under physical stress.

Accordingly, for the same reasons as to claim 1, claim 5 is believed patentable.

See claim 7 reciting the deformable portion being sealed with resin. Where do the references teach this?

As to claim 9, where is the teaching of the resin-sealed reinforcing portion, including the deformable portion, also includes a portion of the outside frame?

Finally, as to claim 10, where is the teaching of the deformable portion preventing the positioning holes and the element loading holes from being displaced to thereby maintain a pre-selected positional relation between the positioning holes and the element loading portions.

Thus, these dependent claims are also believed patentable in their own right.

Claims 11-14 stand rejected as obvious over WOOLVERTON in view of GO et al. and WILLIAMS et al. 6,307,755.

Claim 11 requires a pair of element loading portions loaded with semiconductor elements and positioned one above the other. WOOLVERTON is not seen as disclosing this. The modifications proposed to WOOLVERTON do not appear to provide for this.

GO et al. teach a die mount pad rather than the recited element loading portions loaded with semiconductor elements and positioned one above the other.

WILLIAMS et al. are not seen as teaching element loading portions loaded with semiconductor elements and positioned one above the other. Rather, WILLIAMS et al. teach



sandwiching a die fixed in place with adhesive between two leads.  
See Abstract, face of patent.

See also the recitation of only one of the pair of element loading portions being bent upward relative to the leads. This is not found in the references.

Again, the motivation to combine the references is lacking.

As to the obviousness rejections discussed above, the MPEP §706.02(j), requires to establish a *prima facie* case of obviousness the Official Action must first, consider the relevant teachings of the prior art, and after determining the differences between the pending claim and the prior art teachings, second, propose modifications of the prior art necessary to arrive at the claimed subject matter, explaining the motivation for combining the particular references and making the proposed modifications to those references. Thus, there must be motivation to modify the references and a teaching or suggestion of **all** the claim recitations.

Only the present application offers the recited disclosure, and it is well established that the teaching or suggestion to make the claimed combination and the reasonable expectation of success therein must both be found **in the prior art, and not be based on the present disclosure**. *In re Vaeck*, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Further, the prior art

references must either expressly or impliedly suggest the claimed invention or the Official Action must convincingly reason why one skill in the art would have found the claimed invention obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (Bd. Pat. App. & Inter. 1985). In the present situation, there is no teaching or suggestion available to provide the requisite motivation, suggest the necessary modifications, or provide the reasonable expectation of success. Thus, the obviousness rejections are not believed to be viable.

It seems that in this application, the inventors' present disclosure is effectively being used to render the claimed invention obvious. Such an approach is not permitted.

Relevant to this, the Federal Circuit emphasized in July, 1998 that "[m]ost, if not all, inventions are combinations and mostly of old elements." *In re Rouffett*, 47 USPQ 2d 1453, 1457 citing to *Richdel, Inc. v. Sunspool Corp.*, 219 USPQ 8, 12 (Fed. Cir. 1983). The Federal Circuit continued by noting that "rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blue print for piecing together elements in the prior art to defeat the patentability of the claimed invention."

Thus, the Federal Circuit requires that in order to prevent the use of such hindsight, the Official Action must "show

reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." (*In re Rouffett* at 1458).

The present rejections fail to meet these standards.

Claims 15 and 17 stand rejected as obvious over WOOLVERTON in view of MIZUUCHI 6,194,238 and KELLEHER et al. 5,734,197.

There is no showing as to why one of skill would modify WOOLVERTON to include lead forming and sealing steps. Without motivation, there is no basis for moving the teachings of the secondary references into WOOLVERTON's manufacturing method. Indeed, see that WOOLVERTON teaches the optic device being prepared separately from the frame (Figure 3) and the separately prepared device being mounted to the frame.

As to KELLEHER et al. showing a deformable lead frame, where are the teachings of i) bending the lead forming portions after primary sealing using a light-transmitting resin, and ii) sealing the deformable portions included in the lead frame, after the step of bending the lead forming portions (already sealing in light-transmitting resin)?

It would be contrary to WOOLVERTON to seal the flexible joint 15 as this would negate the advantage of being able to

mount the assembled diode array in three dimensional space, the flexibility of the joint 15 being lost.

For the above reasons, the obviousness rejection is not believed to be viable and should be withdrawn.

Claim 19, depending from claim 15, stands rejected as obvious in further view of GO 6,377,742.

Even in view of GO, the proposed combination based on WOOLVERTON would have no tie bar connected to an outside frame, with a deformable portion included in the tie bar for protecting the outside frame from deforming.

Accordingly, Applicants believe that all the claims are patentable. Reconsideration and allowance of all the claims are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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